Controls Project: Summary of Progress and Plans
July, 2001

This discussion reviews the progress since the last PAC meeting[1], current results, and immediate next steps for the power management controls project. To date, the progress and plans are consistent with that approved by the PAC at the November, 2000 meeting.

In addition to this summary, the following have also been posted on the project web site (http://eetd.LBL.gov/Controls) under "Publications":

- Tentative Recommendations. Our initial conclusions about interface elements.

- Lessons from User Interface Literature. Key points to date from our literature review.

- Instructions for Powering your PC. A sample of what could be given to average users describing the proposed standard for a specific product.

- Assessed Devices, A list of specific office equipment and consumer electronics models that we have collected data for to date.

- Data files. These are not intended for PAC review, but are available for inspection for those curious to see some of the detailed data collected.

Additionally, a set of web pages "Symbols: Do They Work?" was added to the "Overview" section of the web site to make the case that existing symbols are not readily identifiable. In the coming weeks, will be putting additional sets of pages on the web.

Specific actions for the PAC to consider are printed in **boldface** below, in addition to being summarized in the meeting agenda.

The plan for this phase of the project has three components: Outreach, Literature Review, and Data Collection and Analysis.

For **Outreach**, we have continued to contact potentially interested people to enlarge our email list for project updates. We also took the project poster to the IBM "Make IT Easy" conference in June. As the project produces more results (rather than simply identifying the problem and collecting data), we will increase the outreach efforts. We believe that it would be valuable to make site visits to office equipment manufacturers to both present our findings and learn more about the constraints and issues faced by product designers. **We would like the PAC to identify any specific additional outreach that should be done in the next six months, plus any longer-term outreach that requires more advance planning** (such as conferences or trade shows).

The foundation of the **Literature Review** consisted of reviewing several highly recommended books about user interface design generally from which we extracted key lessons relevant to this project. The summary of that is the "Lessons from User Interface Literature" discussion. None of the books were about power controls specifically, though several of them referred to it in passing. One outgrowth of this review is the sample "Instructions", which presents the key points of our tentative recommended use of basic interface elements for future products. **Our plan going forward for the Literature Review is to only seek out papers that are *specifically* relevant to the project, or other literature that both comes very highly recommended and covers ground not already dealt with by the sources already reviewed; we would like the PAC to concur with this.** We consider the Literature Review substantially done, and that additional references will be incorporated into the topical discussions, not in any separate literature review document. We also expect to engage in additional steps that the User-Centered Design process suggests.

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[1] See the project web site for an explanation of the PAC and account of the previous meeting.

Since the November meeting, we have focused primarily on **Data Collection and Analysis**. This involves examining individual devices, extracting key points about their power and power management controls, and aggregating and analyzing these findings. These efforts continue.

The set of devices for which we currently have data is listed on the "Assessed Devices" table. The selection of these has been guided by what we found on visits to stores, what is readily at hand at LBNL, and what we easily found manuals for on the web. We expect to add to this list as we come across additional devices which are particularly interesting. **We would also like PAC feedback as to areas in which additional coverage seems merited, either by category, or specific models to add.**

We have developed two procedures to evaluate and catalog devices—one for assessing a device directly, and another for doing so via the product's user manual. For the former, we observe the device in various power states and record all of the controls and indicators that we can find, photographing it as is helpful. The notes are then written up, and particularly interesting images entered into our image database. In most cases, we don't have ready access to the physical device, so rely on the user manual for the data. For these, we first download the manual from the web, print out pages potentially relevant, highlight figures, phrases, or discussions that are relevant, and then summarize this in text. From the data on individual devices, we search across all assessed devices to observe how the same element is treated on different devices. Examples include the colors or other behaviors of indicator lights, and the symbols associated with power switches and/or indicators. Our conclusions are based on synthesis of these data summaries and integration of lessons from the literature review and our own judgement.

To date, we have fully catalogued and analyzed interface data for only some devices; for others we have only reviewed the manual. This is a labor-intensive process and for some aspects may have reached a point of diminishing returns. The data collection process reveals several types of information:

- The most common implementations of a particular interface element or condition.

- The range of existing implementations, including those worth particular consideration for the standard.

- Conditions which require special treatment.

These results can be used to:

- Suggest the content of the voluntary standard.

- Suggest needed exceptions and alternatives.

- Provide data to help market the standard to product designers, standards committees, etc.

To date, we have been cataloging *every* relevant aspect of each device. However, we believe that the process can be streamlined without loss of quality by being more selective in the data gathering and filtering. Once the dominant implementation(s) have been identified, we could then document only those additional ones which seem particularly interesting for some reason. **We would like PAC concurrence on "pruning" the device assessment process.**

The final topic is our "tentative recommendations". **We would like PAC concurrence to use these in outreach, specifically to standards committees, and to serve as a basis for discussion.** We are not seeking that the PAC endorse the tentative recommendations at this time, but encourage you to use them as a tool for discussion within your organizations.

The overall project workplan is guided by the list of 22 topic areas identified and ranked in the first PAC meeting. We remind the PAC that comments on the list of topics and the priorities assigned to each are always welcome.

As explained in the "Tentative Conclusions", our focus to date has been on the core elements of the user interface. Our focus will shift to other topic areas once the core is defined, or once we have more examples of devices that address the particular topic.